GUIDELINES FOR VERIFYING CERTIFIED TESTING RESULTS

GENERAL

Agency field personnel monitor certified testing by contractor personnel on a regular basis. Tolerances given herein are for use as guides to flag test result variations that indicate a possible discrepancy.

TOLERANCES

The tolerances shown in the following listing apply to the difference between certified test results and monitoring test results. When the tolerances are exceeded, an immediate investigation must be made to determine possible cause so that any necessary corrections can be made.

TEST NAME	TEST METHOD	TOLERANCE
Slump of PC Concrete	IM 317	6 mm (¼ in.)
Air Content of PC Concrete	IM 318	0.4%
Length of Concrete Cores	IM 347	2 mm (0.10 in.)
Free Moisture in Aggregate, By Pycnometer	IM 308	0.2%
Specific Gravity of Aggregate, by Pycnometer	IM 307	0.02
Moisture in Aggregate or Recycled Asphalt Paving, By Hot Plate		0.3%
Density of AC Concrete, by Displacement	IM 321	0.02
Pavement Profile, by 7.6 m (25 foot) Profilograph, Profile Index, mm/km (in/mi):	IM 341	
Less than 93 mm/km (6 in./mi.)		16 mm/km (1 in./mi)
93 to 311 mm/km (6 to 20 in./mi.)		31 mm/km (2 in./mi.)
311 to 622 mm/km (20 to 40 in./mi.)		47 mm/km (3 in./mi.)
More than 622 mm/km (40 in./mi.)		78 mm/km (5 in./mi.)

TOLERANCES FOR AGGREGATE GRADATIONS

Determining the precision of an aggregate sieve analysis presents a special problem because the result obtained with a sieve is affected by the quantity of material retained on the sieve and by results obtained on sieves coarser than the sieve in question. Tolerances are, therefore, given for different ranges of percentage of aggregate passing one sieve and retained on the next finer sieve used.

Comparisons of test results are made on each fraction of the sample, expressed in percent that occurs between consecutive sieves.

Note: Comparisons of aggregate gradations are only valid if the two tests were made on a split sample.

Table 1 gives tolerances for the coarse portion (#4 sieve size material and larger) and the fine portion (material smaller than the #4 sieve) of aggregates. For analysis of combined aggregate for HMA, table 2 will be used for all sieve sizes.

Table 1 Tolerances for All Aggregates Except HMA-Combined Aggregate

	Size Fraction Between Consecutive Sieves, %*	Tolerance, %
Coarse Portion	0.0 to 3.0	2
#4 Sieve and larger	3.1 to 10.0	3
	10.1 to 20.0	5
	20.1 to 30.0	6
	30.1 to 40.0	7
	40.1 to 50.0	9
Fine portion:	0.0 to 3.0	1
#8 Sieve and smaller	3.1 to 10.0	2
	10.1 to 20.0	3
	20.1 to 30.0	4
	30.1 to 40.0	4

Table 2 Tolerances for All HMA-Combined Aggregate

Size Fraction Between Consecutive Sieves, %*	Tolerances
0.0 to 3.0	2
3.1 to 10.0	3
10.1 to 20.0	5
20.1 to 30.0	6
30.1 to 40.0	7
40.1 to 50.0	9

*The monitoring analysis fraction is used to find the proper tolerance. Use of these tolerances is explained in the following examples. Gradation results are reported in two significant figures. Fraction differences between two sieves, one of which is reported to one decimal place, should be calculated to one decimal place.

EXAMPLE #1 - 57 CONCRETE STONE

Sieve Size	Gradation Percent PSG Monitor	Certified	Percent Retained Monitor Fraction	Certified Fraction	Fraction Diff.	Applicable Tolerance	Disposition
37.5 mm (1.5 in.)	100	100					
25 mm (1.0 in.)	97	99	3	1	2	2	OK
19 mm (3/4 in.)	72	65	25	34	9	(+4) 6	Suspect
12.5 mm (0.5 in.)	38	35	34	30	4	7	OK
9.5 mm (3/8 in.)	12	8.8	26	26.2	0.2	6	OK
4.75 mm (#4)	0.6	0.2	11.4	8.6	2.8	5	OK
2.36 mm (#8)	0.5	0.2	0.1	0.0	0.1	1	OK
75 μm (#200)	0.5	0.2	0.0	0.0	0.0	(-4) 1	OK
Pan	0	0	0.5	0.2	0.3	1	OK

The size fraction between consecutive sieves is found by calculating the difference between the % PSG reported for the two sieves. For example, the fraction between the 37.5 mm (1.5 in.) and 25 mm (1 in.) sieves for the above monitor test is 100 minus 97 equaling 3%. Between the 12.5 mm (1/2 in.) and 9.5mm (3/8 in.) sieves it is 38 minus 12 equaling 26%. Since nothing passes the pan, the size fraction between the 75 μm (#200) sieve and the pan is equal to the percent passing the 75 μm (#200).

The example shows the fraction between each pair of consecutive sieve sizes for both tests and the difference between these fractions for both tests. The difference is compared with the applicable tolerance to determine a disposition. In this example, a suspect result is found in the fraction between the 25 mm (1 in.) and 19 mm (3/4 in.) sieves. Since the suspect difference is due primarily to the % PSG results on the 19 mm (3/4 in.) sieves, it is these results that should at least be investigated first. Only further investigation can determine which 19 mm (3/4 in.) sieve, if any is faulty.

Note: The applicable tolerance changes between +4.75-mm/#4 and -4.75-mm/#4 size fractions. Note in the following example the applicable tolerance change as it applies to a Fine Aggregate gradation.

EXAMPLE #2 - CONCRETE SAND

Sieve Size	Gradation Percent PSG Monitor	Certified	Percent Retained Monitor Fraction	Certified Fraction	Fraction Diff.	Applicable Tolerance	Disposition
9.5 mm (3/8 in.)	100	100					
4.75 mm (#4)	95	95	5	5	0	(+4) 3	OK
2.36 mm (#8)	88	86	7	9	2	2	OK
1.18 mm (#16)	72	71	16	15	1	3	OK
600 μm (#30)	44	44	28	27	1	(-4) 4	OK
300 μm (#50)	12	13	32	31	1	4	OK
150 μm (#100)	1.5	1.3	10.5	11.7	1.2	3	OK
75 μm (#200)	0.4	0.4	1.1	0.9	0.2	1	OK
Pan	0.0	0.0	0.4	0.4	0	1	OK

EXAMPLE #3 - 13.2 mm (1/2 in) ACC STONE - COMBINED AGGREGATE

Sieve Size	Gradation Percent PSG Monitor	Certified	Percent Retained Monitor Fraction	Certified Fraction	Fraction Diff.	+4.75 mm Applicable Tolerance	Disposition
19 mm (3/4 in.)	100	100					
12.5 mm (0.5 in.)	99	99	1	1	0	2	OK
9.5 mm (3/8 in.)	87	86	12	13	1	5	OK
4.75 mm (#4)	69	75	18	11	7	5	SUSPECT
2.36 mm (#8)	54	56	15	19	4	5	OK
1.18 mm (#16)	41	42	13	14	1	5	OK
600 μm (#30)	28	29	13	13	0	5	OK
300 μm (#50)	15	15	13	14	1	5	OK
150 μm (#100)	9.1	11	5.9	4	1.9	3	OK
75 μm (#200)	6.9	8.6	2.2	2.4	0.2	2	OK
Pan	0.0	0.0	6.9	8.6	1.7	3	OK

NOTE: The applicable tolerance for this combined aggregate sample is from the +4.75-mm/#4 table. In this example, the suspect fractions would indicate a possible problem for two pairs of consecutive sieve sizes involving the 4.75 mm (# 4) sieves. This evidence and the difference in the test values found for the 4.75 mm (# 4) sieves, strongly point to an error in one of the 4.75 mm (# 4) sieve results.

When RAP mixes are used the comparison data is of the composite gradation results and not of the cold feed.